

Pamphilius histrio (Hymenoptera, Pamphiliidae) and its Close Relatives¹⁾

By

Akihiko SHINOHARA

Department of Zoology, National Science Museum, Tokyo

Abstract The *histrio* group of the sawfly genus *Pamphilius* and its five subgroups are defined to include ten Palearctic and one Nearctic species: *P. betulae* LINNAEUS, 1758, and *P. festivus* PESARINI et PESARINI, 1984 (the *betulae* subgroup), *P. histrio* LATREILLE, 1812 (the *histrio* subgroup), *P. pictifrons* GUSSAKOVSKIJ, 1935 (the *pictifrons* subgroup), *P. gyllenhali* DAHLBOM, 1835, *P. tricolor* BENEŠ, 1974, *P. infuscatus* MIDDLEKAUFF, 1964, *P. virescens* MALAISE, 1931, and *P. borisi* BENEŠ, 1972 (the *gyllenhali* subgroup), *P. brevicornis brevicornis* HELLÉN, 1948, *P. brevicornis ibukii* subsp. nov. from Japan and *P. maximus* sp. nov. from the Russian Far East and Korea (the *brevicornis* subgroup). Based on a cladistic analysis using PAUP (SWOFFORD, 1993), a hypothesis of the phylogenetic relationships of the component species is proposed. A review of the 11 species is given, including, besides descriptions of the two new taxa, a key, description of the previously unknown male of *P. tricolor*, and the following new records: *P. histrio*, *P. tricolor*, *P. virescens* and *P. brevicornis brevicornis* from Korea, and *P. tricolor* and *P. virescens* from Japan.

Pamphilius LATREILLE, 1802, is the largest genus of the web-spinning or leaf-rolling sawfly family Pamphiliidae. Distributed throughout the Holarctic Region, the genus is represented by about 90 described species, which can be classified into several species-groups. The *vafer* group (26 species: BENEŠ, 1976; SHINOHARA, 1988 b; SHINOHARA & TAEGER, 1990), the *sylvaticus* group (22 species: SHINOHARA, 1985, 1988 c) and the *alternans* group (14 species: SHINOHARA, 1991) are the three largest species-groups.

The *histrio* group, which forms the subject of this paper, is another major clade within the genus. It was first proposed by BENEŠ (1972) to include the following ten Palearctic species: *P. histrio* LATREILLE, 1812, *P. gyllenhali* DAHLBOM, 1835, *P. brevicornis* HELLÉN, 1948, *P. virescens* MALAISE, 1931, *P. pictifrons* GUSSAKOVSKIJ, 1935, *P. sulphureipes* KIRBY, 1882, *P. volatilis* (SMITH, 1874), *P. alnicola* ERMOLENKO, 1973 [cited as *P. sp. cf. volatilis*], *P. takeuchii* BENEŠ, 1972, and *P. borisi* BENEŠ, 1972. According to BENEŠ (1972), the *betulae* group (one species) and *inanitus* group (three or four species) were closely related to the *histrio* group, and the three could be combined into the *histrio*–

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inanitus group, each of the three being treated as its subgroups. BENEŠ (1974) later described two new species (*P. tricolor* and *P. zhelochovtsevi*) as belonging to the *histrion* subgroup, moved *P. volatilis* and *P. alnicola* from the *histrion* subgroup to the *inanitus* subgroup, and newly separated *P. sulphureipes* into the *sulphureipes* subgroup. BENEŠ's (1974) *histrion*–*inanitus* group thus contained the *histrion* subgroup (9 species), *inanitus* subgroup (5 species), *betulae* subgroup (1 species) and *sulphureipes* subgroup (1 species).

My subsequent studies (SHINOHARA, 1985, 1991, 1993) have shown that species-groups in *Pamphilius* are better recognized on the basis of male genitalic characters, and largely on this basis, I have transferred *P. takeuchii* from the *histrion* group (BENEŠ's *histrion* subgroup) to the *alternans* group (SHINOHARA, 1991) and *P. zhelochovtsevi* to the *sulphureipes* group (SHINOHARA, 1993).

In this paper, I will redefine the *histrion* group, recognizing five subgroups in it, review the species included therein, and discuss the phylogenetic relationships among them. My *histrion* group roughly corresponds to BENEŠ's *histrion* subgroup plus *betulae* subgroup. It comprises eleven species, including seven remaining species of BENEŠ's *histrion* subgroup, *P. betulae*, *P. festivus* PESARINI et PESARINI, 1984, a recently described species closely related to *P. betulae*, *P. infuscatus* MIDDLEKAUFF, 1964, a Nearctic species not treated by BENEŠ (1972, 1974), and *P. maximus* sp. nov. Species of the *histrion* group inhabit mainly northern temperate forests, and the known larvae solitarily feed on the leaves of *Salix* or *Populus*, making a spiral or screw-shaped abode.

The material used in this work is kept in the National Science Museum (Nat. Hist.), Tokyo, unless otherwise stated. The following abbreviations are used for other depositories: BVI—B. N. VERZHUTSKIY Collection, Irkutsk; MU—Moscow State University, Moskva; NRS—Naturhistoriska Riksmuseet, Stockholm; UOP—University of Osaka Prefecture, Sakai; USNM—United States National Museum, Washington, D.C.; ZISP—Zoological Institute, Russian Academy of Sciences, St. Petersburg.

The Group of *Pamphilius histrion*

The species of this species-group are characterized as follows: Black with extensive pale yellow and orange marking; legs without black marking on femora; abdomen marked with orange at least dorsally. Head rather smooth and generally glabrous, with upper part behind transverse and lateral transverse sutures, and paraantennal field always glabrous; upper part of frons strongly roundly swollen, with longitudinal depression or furrow running from ocellar area to median fovea ("medially notched"); facial crest strongly roundly swollen; antennal furrows very deep. Right mandible with basal tooth and less acute median tooth or basal shoulder of apical tooth. Antenna with 3rd segment 1.0–

2.5 times as long as 4th. Hind tibia with three preapical spurs. Forewing with venation normal, cell C glabrous, and stigma concolorous or with inconspicuously different colors on anterior and/or posterior margins. Subgenital plate simple. Male genitalia: valviceps rather elongate, somewhat flattened laterally, dorsoapically with a conspicuous process ("apically hooked"); apiceps large, subtriangular, subrectangular, rounded or ax-shaped in ventral view, often dorsoventrally flattened, and often with primary apical finger-like process reduced; gonostipes, seen from above, subtriangular or subrectangular in outline, without narrow plate-like process along posterior margin.

Monophyly of this species-group is supported by the "apically hooked" valviceps in the male genitalia, which is unique to the members of this group and undoubtedly their synapomorphy. The almost entirely glabrous head with strongly inflated and "medially notched" upper part of frons and similarly strongly inflated facial crest is also characteristic of this species-group. A similar structure of the head known in some species of *Pamphilius* (e.g., species of the *sulphureipes* and *inanitus* groups, and several species of the *alternans* and *sylvaticus* groups), which were included by BENEŠ (1972, 1974) in his *histrio-inanitus* group (see introduction), is probably of independent origin as discussed by SHINOHARA (1985, 1991, 1993).

The host-plants are known for five species as listed below and all feed on Salicaceae, *Populus* or *Salix*, solitarily making a leaf-roll of the type (b) or (c) (CHAMBERS, 1952). Apart from these, there is only one species of *Pamphilius* known to feed on Salicaceae, i.e., *P. latifrons* (FALLÉN) from Eurosiberia on *Populus*. The systematic position of this species is somewhat problematical, although it was placed in the *vafer* group by BENEŠ (1976).

The *histrio* group is represented by ten Palearctic and one Nearctic species. Based on the cladistic analysis given below and some phenetic considerations, I propose here to classify the 11 species of the *histrio* group into 5 subgroups as follows:

The *betulae* subgroup: Large species, with conspicuous, orange and black coloration in female (head mostly orange; thorax mostly black; wings with blackish marking; abdomen orange with black apical segments); antennal scape entirely orange; ratio of 3rd to 4th antennal segments 1.6–1.8 in female, 1.5–1.7 in male; mesoscutellum moderately to strongly convex; tarsal claw with inner tooth much thicker and longer than outer one; sawsheath of normal size, without conspicuous projections, peg absent (Fig. 1 A); gonostipes subtriangular in outline in dorsal view (Fig. 4 A); apiceps of less modified type, subtriangular in outline in ventral view; distivolsella very large, protruding (Fig. 4 B); valviceps subtriangular in outline in lateral view (Fig. 4 C).

Two very closely related species are included.

P. betulae LINNAEUS, 1758

Europe, eastern Siberia (on *Populus*)

P. festivus PESARINI et PESARINI, 1984 Europe (on *Populus*)

The *histrion* subgroup: Large species, with coloration of normal *Pamphilius* type (head and thorax black with pale yellow marking; wings without distinct blackish pattern; abdomen black, with pale yellow and orange marking); antennal scape entirely pale yellow; ratio of 3rd to 4th antennal segments 2.0–2.4 in female, 1.8–2.3 in male; mesoscutellum normal (flattened or weakly convex in lateral view); tarsal claw with inner tooth much thicker and longer than outer one; sawsheath of normal size, with two conspicuous projections, peg absent (Fig. 1 B); gonostipes subtriangular in outline in dorsal view (Fig. 4 D); apiceps broad, subrectangular in outline in ventral view, with apical finger-like process situated near inner apical margin; distivolsella normal (Fig. 4 E); valviceps elongate (Fig. 4 F).

One species is included.

P. histrion LATREILLE, 1812 Europe, Korea (on *Populus*)

The *pictifrons* subgroup (male unknown): Medium-sized species, with coloration of normal *Pamphilius* type; antennal scape almost entirely black; ratio of 3rd to 4th antennal segments 2.3 in female; mesoscutellum normal; tarsal claw with inner tooth thicker and a little longer than outer one; sawsheath of normal size, with large, elongate, pilose peg (Fig. 1 C).

One species is included.

P. pictifrons GUSSAKOVSKIY, 1935 Eastern Siberia, Russian Far East

The *gyllenhali* subgroup: Medium-sized species, with coloration of normal *Pamphilius* type; antennal scape entirely pale yellow to almost entirely black; ratio of 3rd to 4th antennal segments 1.9–2.5 (1.3 in *borisi*) in female, 1.8–2.2 in male (male of *borisi* unknown); mesoscutellum normal; tarsal claw with inner tooth smaller and shorter than outer one (stout and a little longer in *borisi*); sawsheath of normal size, with large, glabrous peg, which is roundly convex (Fig. 1 D) or cylindrical, directed below (Fig. 1 E); gonostipes subtriangular in outline in dorsal view (e.g., Fig. 6 A); apiceps broad, rounded in ventral view, with primary apical finger-like process reduced, inconspicuous, situated at middle on inner margin; distivolsella normal (e.g., Fig. 6 B); valviceps various in shape (Figs. 6 C, F; 8 C).

Five species are included.

P. gyllenhali DAHLBOM, 1835

Europe (on *Salix*)

P. tricolor BENEŠ, 1974

Eastern Siberia, Russian Far East,
Korea, Japan

P. infuscatus MIDDLEKAUFF, 1964

North America (on *Populus*)

P. borisi BENEŠ, 1972

Eastern Siberia

P. virescens MALAISE, 1931

Russian Far East, Korea, Japan

The *brevicornis* subgroup: Large species, with coloration of normal *Pamphilius* type; antennal scape entirely pale yellow or pale brown; ratio of 3rd to 4th

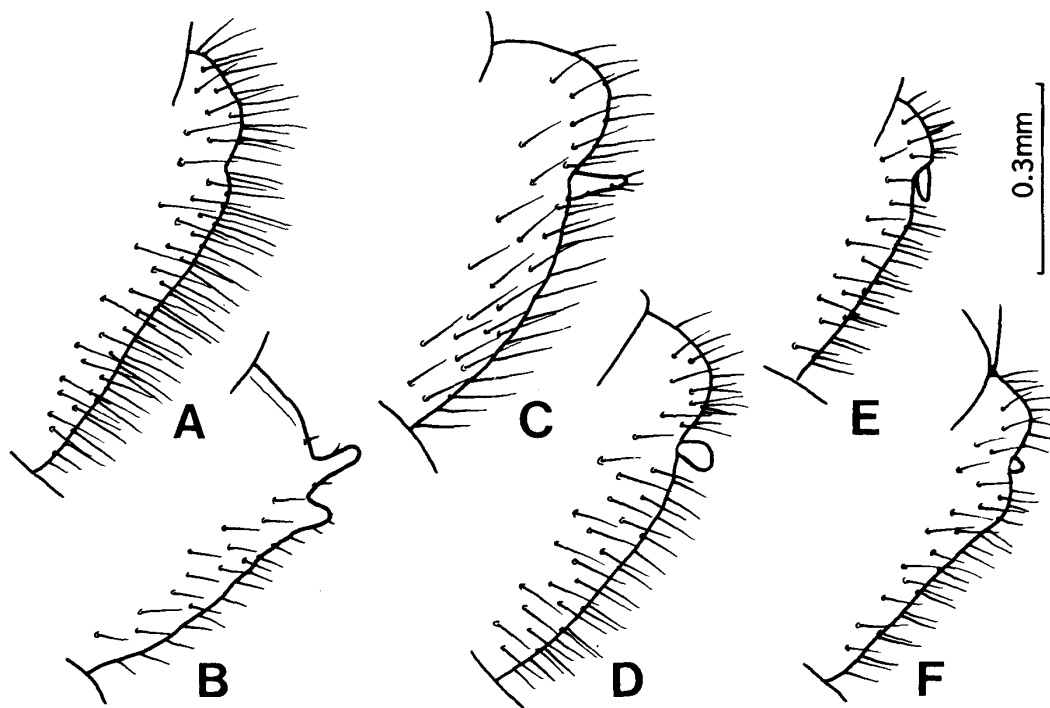


Fig. 1. Sawsheaths. A, *P. betulae*, BV Rollag, Norway; B, *P. histrio*, Mirugam, Korea; C, *P. pictifrons*, holotype; D, *P. gyllenhalii*, AK Bærum, Norway; E, *P. virescens*, Yamadaonsen, Japan; F, *P. maximus*, holotype.

antennal segments 1.3–1.4 (in *brevicornis*) or 1.7–1.8 (in *maximus*) in female, 1.0–1.3 (in *brevicornis*) in male; mesoscutellum normal; tarsal claw with inner tooth smaller and shorter than outer one; sawsheath small, with small, very sparsely pilose or glabrous peg (Fig. 1 F); gonostipes rectangular in outline in dorsal view (Fig. 8 D); apiceps broad, ax-shaped in ventral view, with distinct primary apical finger-like process situated at middle on inner margin; distivolsella normal (Fig. 8 E); valviceps elongate (Fig. 8 F).

Two species, one polytypic, are included.

- | | |
|--|--|
| <i>P. brevicornis brevicornis</i> HELLÉN, 1948 | Europe, eastern Siberia, Russian Far East, Korea |
| <i>P. brevicornis ibukii</i> subsp. nov. | Japan |
| <i>P. maximus</i> sp. nov. | Russian Far East, Korea |

Relationship

Methods

A cladistic analysis was performed using computer programs to present a hypothesis about the phylogenetic relationships among the component species. Table 1 shows an input file (data matrix showing character distribution) created by using the spreadsheet editor of MacClade version 3.03 (MADDISON &

MADDISON, 1992). Character states were coded additively. Plesiomorphic states for all characters were inferred by outgroup comparison and coded [0], except for character 3 whose plesiomorphic state was indeterminable. For outgroups, I took all the other species of *Pamphilius* into consideration, because the sister group of the *histrion* group has not been determined.

The data set was then input to PAUP version 3.1.1 (SWOFFORD, 1993) to find the most parsimonious tree(s). Searches were made by the branch-and-bound algorithm, which finds all the shortest trees, on the three different sets of assumptions: 1) Character states were treated as *unordered* and no weighting was made (*i.e.*, all are weighted 1); 2) character states were treated as *ordered* and no weighting was made; and 3) character states were treated as *ordered* and a weight of 2 was set to seven out of twelve characters, which are indicated by asterisks in the following list. Those seven characters seem to me more stable and reliable than the others.

Characters

1. Length (female). Medium-sized species, 8–11 mm [0]. Larger species, 11–15.5 mm [1].
2. General color pattern (female). Ordinary *Pamphilius* type (head and thorax black with pale yellow marking and wings without distinct dark pattern) [0]. *Betulae* type (head mostly orange, thorax with pronotum entirely orange and mesothorax entirely black, except for tegulae, and wings with distinct dark marking) [1].
3. Color of antennal scape (female). Entirely yellow to brown [0]. Black and yellow [1]. (Almost) entirely black [2].
4. *Ratio of 3rd to 4th antennal segments (female). 1.9–2.5 [0]. 1.6–1.8 [1].

Table 1. Data matrix of coded character states for cladistic analysis. See text for explanation.

Species	Characters											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>betulae</i>	1	1	0	1	1	2	0	1	0	0	0	0
<i>festivus</i>	1	1	0	1	1	2	0	1	0	0	?	?
<i>histrion</i>	1	0	0	0	0	2	0	1	0	0	1	0
<i>pictifrons</i>	0	0	2	0	0	1	0	0	0	0	?	?
<i>gyllenhali</i>	0	0	0	0	0	0	0	0	0	2	2	1
<i>tricolor</i>	0	0	1/2	0	0	0	0	0	0	2	2	1
<i>infuscatulus</i>	0	0	2	0	0	0	0	0	0	2	?	?
<i>borisi</i>	0	0	0	2	0	1	0	0	0	2	?	?
<i>virescens</i>	0	0	1	0	0	0	0	0	0	1	2	1
<i>brevicornis</i>	1	0	0	2	0	0	1	0	1	0	3	0
<i>maximus</i>	1	0	0	1	0	0	1	0	2	0	?	?
OUTGROUP	0	0	?	0	0	0	0	0	0	0	0	0

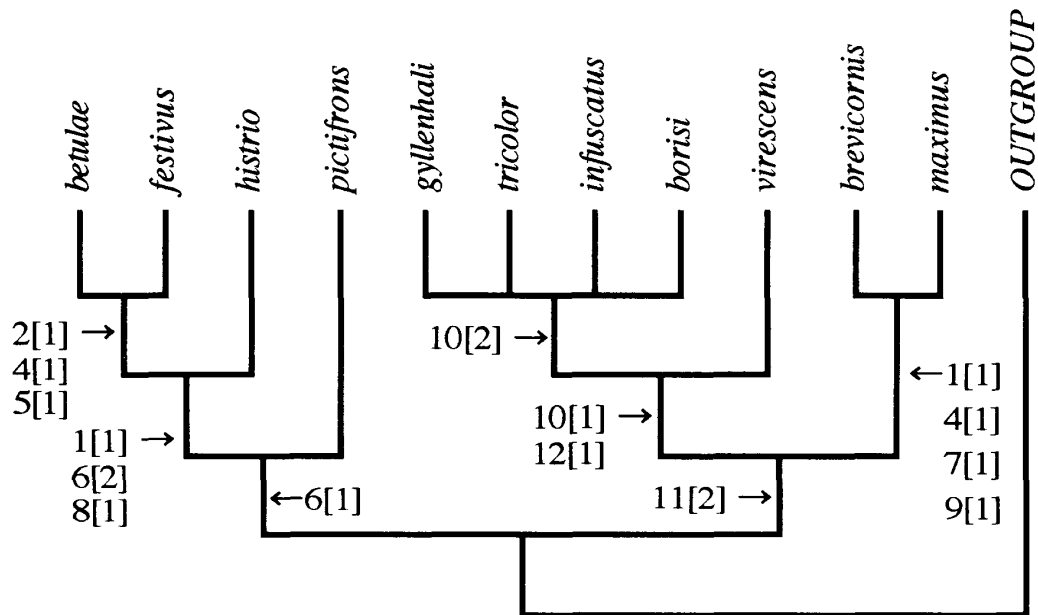


Fig. 2. Cladogram showing a hypothesis of relationships among the species of the *histrio* group, created on the basis of a data matrix shown in Table 1. Paired numerals refer to each of the synapomorphies (a character and its state (in square bracket)) supporting the monophyly of the clade. See text for explanation.

- 1.3–1.4 [2].
5. Mesoscutellum. Flattened or slightly convex in lateral view [0]. Moderately to strongly convex in lateral view [1].
6. *Inner tooth of tarsal claw (female). Smaller and shorter than outer one [0]. Stout and a little longer [1]. Very stout and much longer [2].
7. Sawsheath. Of normal size [0]. Small [1].
- 8–10. *Sawsheath peg. Sawsheath peg of the *histrio* group shows six character states which cannot be properly arranged in a linear sequence. Here I take the following hypothesis: the large elongate pilose peg as observed in *P. pictifrons* (Fig. 1 C), which is common in *Pamphilius*, is plesiomorphic for the *histrio* group. From this condition, transformation occurred in three different directions: a)[character 8] peg lost [1] (Fig. 1 A, B); b)[character 9] peg small, very sparsely pilose [1], small, glabrous [2] (Fig. 1 F); and c) [character 10] peg glabrous, directed below [1] (Fig. 1 E), glabrous, rounded [2] (Fig. 1 D).
- 11–12. *Apiceps in male genitalia. Four character states in general shape (character 11) are observed: a) subtriangular in outline in ventral view, basally constricted [0] (Fig. 4 B); b) broad, subrectangular in outline in ventral view, with finger-like process situated at inner apical corner [1] (Fig. 4 E); c) disk-like, with the primary apical finger-like process situated at middle on inner margin [2] (e.g., Fig. 6 B), and d) ax-shaped, with the finger-like process situated at middle on inner margin [3] (Fig. 8 E). Of

these, the state a is known also for certain species of other species-groups, e.g., the *alternans* and *sulphureipes* groups (SHINOHARA, 1991, 1993), and inferred here as plesiomorphic for the *histrion* group. The states b, c and d are regarded as successive derivations from the state a and coded as such ([0]–[1]–[2]–[3]). In the species showing the state c above, the apical finger-like process (character 12), which is well developed in the plesiomorphic state [0], is reduced, inconspicuous [1].

Results

On the first two sets of assumptions described above, large number of optimal trees were found (178 trees [length 23, consistency index 0.83, retention index 0.83] on the first set, and 20 trees [length 28, consistency index 0.68, retention index 0.76] on the second) and the computed consensus trees were largely unresolved. On the third set of assumptions, where the characters were ordered and weighting was made, three optimal, equally parsimonious trees (length 46; consistency index 0.70; retention index 0.78) were found. The three topologies differ only in the clade containing *gyllenhali*, *tricolor*, *infuscatus* and *borisi*, which is shown as a tetrachotomy in the strict consensus tree. One of the three hypotheses has exactly the same topology as the semistrict consensus tree; i.e., the clade in question has the structure of (*gyllenhali* + *borisi*) + (*tricolor* + *infuscatus*). Even in this case, however, no synapomorphies are postulated for each of the two species pairs. I have therefore selected the tree with tetrachotomy (Fig. 2; the strict consensus tree) as the best current estimate for the relationships. Postulated synapomorphies supporting each clade are also given in Fig. 2. The tetrachotomy here, of course, does not suggest multiple speciation events, but it merely shows unresolved relationships of the four species.

Pamphilius betulae (LINNAEUS)

(Figs. 1 A; 3 A–D; 4 A–C)

Tenthredo betulae LINNAEUS, 1758, p. 599.

Pamphilius betulae: CONDE, 1934, p. 46; GUSSAKOVSKIY, 1935, p. 164, 173, 375; STRITT, 1935 a, p. 151; KLIMA, 1937, p. 52; GREGOR & BAŤA, 1940, p. 218 [*partim?*]; BERLAND, 1947, p. 45, 52; KONTUNIEMI, 1947, p. 128; BENSON, 1948, p. 119; BARENDRECHT, 1949, p. 3; BENSON, 1951, p. 12; CHAMBERS, 1952, p. 132; STRITT, 1952, p. 43; ZHELOCHOVTSEV *et al.* 1955, p. 289; LORENZ & KRAUS, 1957, p. 279; KONTUNIEMI, 1960, p. 63; ERMOLENKO, 1963, p. 46; KONTUNIEMI, 1965, p. 257; WOLF, 1965, p. 458; SCOBIOLO-PALADE, 1968, p. 378; CHEVIN & PAILLER, 1971, p. 67; WOLF, 1971, carte 255; BENEŠ, 1972, p. 46; SCHEDL, 1972, p. 99; MÓCZÁR & ZOMBORI, 1973, p. 29; BENEŠ, 1974, p. 310; CMOLUCH & PIOTROWSKI, 1975, p. 566; BERLAND, 1976, p. 52; OOSTSTROOM, 1976, p. 4; PESARINI & PESARINI, 1976, p. 62; STROGANOVA, 1976, p. 268; ZHELOCHOVTSEV & PROKHOROVA, 1976, p. 99; SCHEDL, 1980, p. 4; ZOMBORI, 1980, p. 62; LISTON, 1981, p. 168; QUINLAN & GAULD, 1981, p. 16; VIITASAAARI, 1982, p. 40, 46, 57; PESARINI & PESARINI, 1984, p. 99; KANGAS, 1985, p. 28;

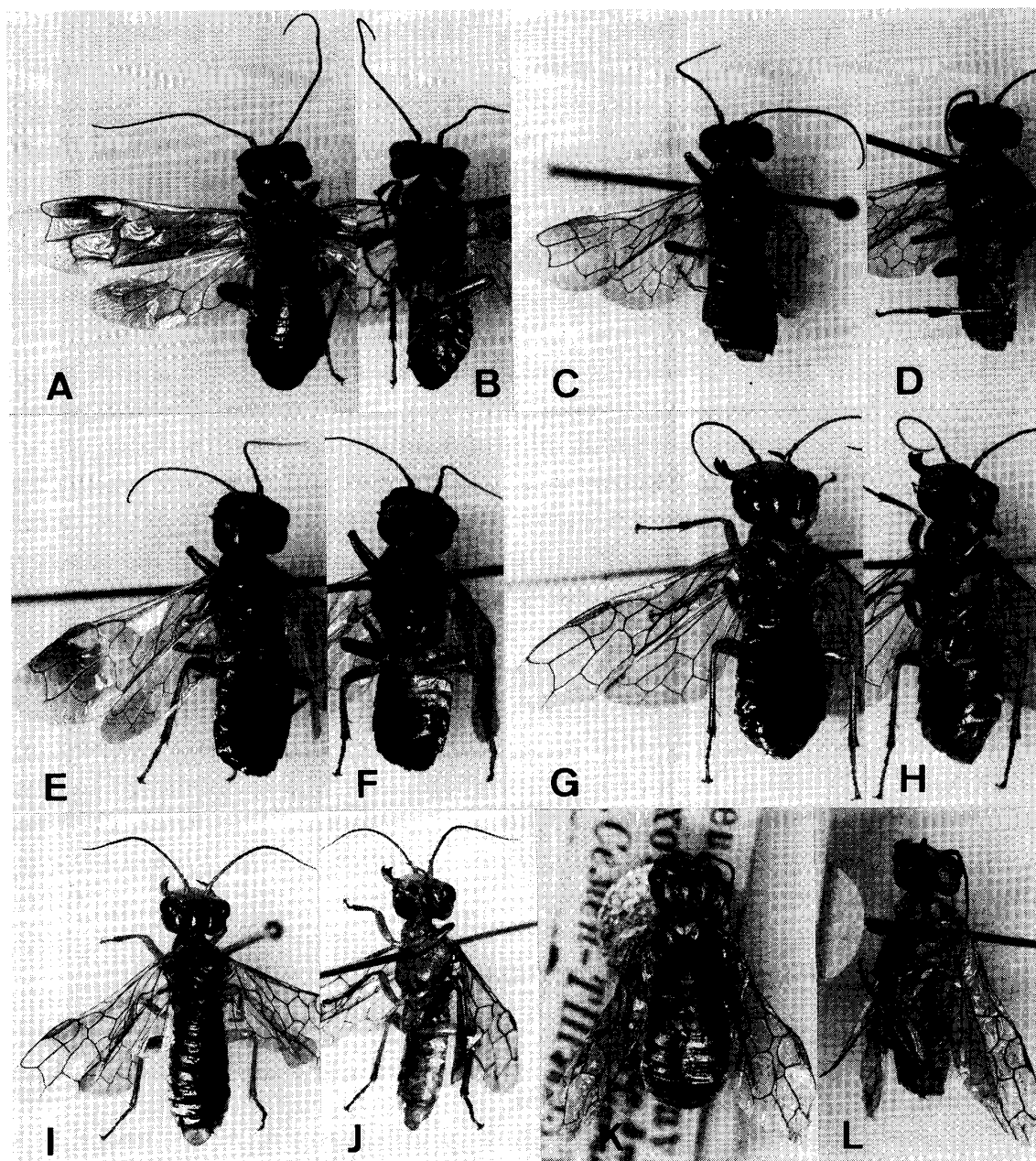


Fig. 3. *Pamphilius* spp. A, B, *P. betulae*, ♀, BV Rollag, Norway; C, D, *ibid.*, ♂, Lammi, Finland; E, F, *P. festivus*, ♀, Lammi, Finland; G, H, *P. histrio*, ♀, Mirugam, Korea; I, J, *ibid.*, ♂, Mirugam, Korea; K, L, *P. pictifrons*, ♀, holotype.

VIITASAARI & VIKBERG, 1985, p. 3; ACHTERBERG & AARTSEN, 1986, p. 29, 38; CHEVIN, 1987, p. 28; MIDTGAARD, 1987, p. 128; MIDTGAARD *et al.*, 1987, p. 35; CHEVIN, 1988, p. 12; MAGIS, 1988, p. 17; PESARINI & PESARINI, 1988, p. 165; ZHELOCHOVTSEV, 1988, p. 30; BENEŠ, 1989, p. 14; CHEVIN, 1990, p. 18; MAGIS, 1994, p. 8.

For more synonymy and references, see KLIMA (1937).

Distribution. Europe; eastern Siberia.

Material examined. Norway: 1 ♀, "BV Rollag, 26. VI. 1981, leg. B. Saguolden". Finland: 1 ♂, "EH Lammi, 29. 5. 1964, leg. Kontuniemi, e. l. *Populus tremula*". Czechoslovakia?: 1 ♀, "Troppau b." "Schlesien, Letzner"; 1 ♀, "u. Kloch, May" "Schlesien, Letzner". Germany: 1 ♂, "Berlin, Pichelsberg, 29. V. 07, Coll. Oldenberg". Austria: 1 ♀, "Autriche, Dornbach près Vienne, coll. Giraud, 1877". Russia: 1 ♀, "Irkutskij r.-n., d. d. Smolenshchina-Olka, VII. 63" (BVI).

Host-plant. *Populus tremula* (CONDE, 1934), *Populus alba* (ACHTERBERG & AARTSEN, 1986).

Remarks. *Pamphilius betulae* and *P. festivus* are very conspicuous species forming the *betulae* subgroup. They are well characterized by the peculiar coloration, huge inner tooth of tarsal claw and simple sawsheath with no trace of a peg (Fig. 1 A). So far as I know, these two species and *P. histrio* are the only species of Pamphiliinae lacking a sawsheath peg; ACHTERBERG and AARTSEN (1986) mentioned that *P. nemorum* (GMELIN, 1788), a member of the *sylvaticus* group, has no sawsheath peg, but the peg is actually present in this species as shown in fig. 53 in SHINOHARA (1985). The presence of protruding distivolsella in male genitalia (Fig. 4 B) is also characteristic of *P. betulae* (and possibly of *P. festivus*, males of which have not been differentiated from those of *P. betulae*).

For a close comparison of *P. betulae* and *P. festivus*, see PESARINI and PESARINI (1984). The shape of mesoscutellum, which was not noted by these authors, may also provide a good distinguishing character. The mesoscutellum is very strongly convex in *P. betulae*, as stressed by BENEŠ (1972, 1974), while it is only moderately convex in *P. festivus*.

Pamphilius festivus PESARINI et PESARINI

(Fig. 3 E, F)

Pamphilius betulae: GREGOR & BAŤA, 1940, p. 218 [*partim?*]; CHEVIN, 1981, p. 43; CHEVIN & TUSSAC, 1983, p. 52. [*Nec* LINNAEUS, 1758.]

Pamphilius festivus PESARINI & PESARINI, 1984, p. 95; ACHTERBERG & AARTSEN, 1986, p. 29, 38; CHEVIN, 1988, p. 12; CHEVIN, 1988, p. 31; PESARINI & PESARINI, 1988, p. 165; SHINOHARA & TAEGER, 1990, p. 90; CHEVIN & TUSSAC, 1992, p. 62.

Distribution. Europe.

Material examined. Finland: 1 ♀, "EH, Lammi, 31. 5. 1964, leg. Kontuniemi" "e. l. *Populus tremula*". Germany: 1 ♀, "Schirmer, Berlin, 17/6. Finkenkrug" "*Pamphilius betulae* L., Malaise det." (UOP).

Host-plant. *Populus tremula* (SHINOHARA & TAEGER, 1990).

Remarks. This species is very closely related to *P. betulae*. They had been confused with each other until *P. festivus* was recently separated from *P. betulae* and described as a new species by PESARINI and PESARINI (1984). These

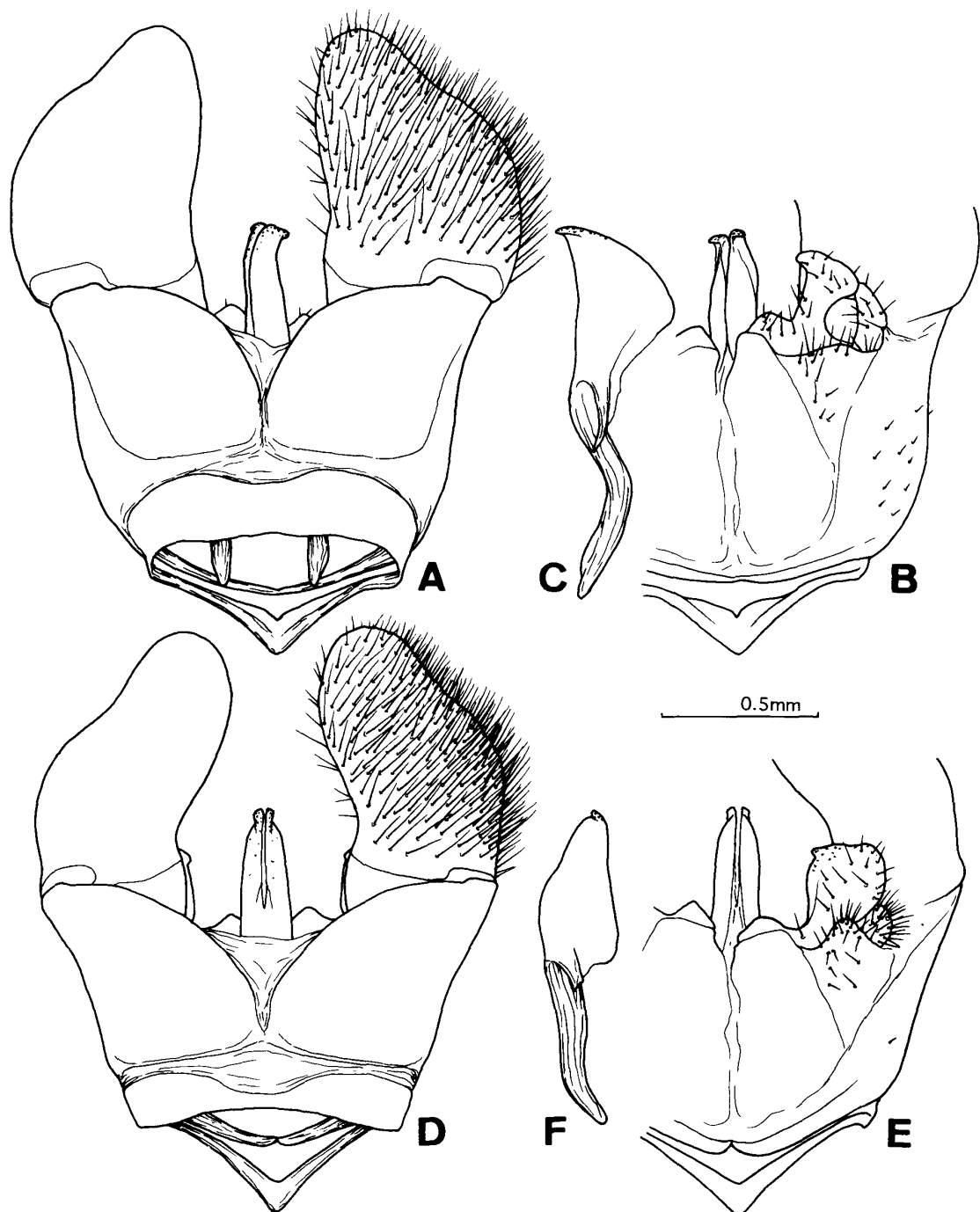


Fig. 4. Male genitalia, *Pamphilius betulae*, Berlin, Germany (A–C) and *P. histrio*, Mirugam, Korea (D–F). A, D, Dorsal view; B, E, ventral view; C, F, penis valve, lateral view.

authors, however, did not make reference to the two old names which are currently treated as junior synonyms of *betulae*, i.e., *Tenthredo fulva* RETZ., 1783, and *Lyda aurita* KLUG, 1808. These are potential senior synonyms of *festivus* and the type material should be reexamined.

Pamphilius histrio LATREILLE

(Figs. 1 B; 3 G–J; 4 D–F)

Pamphilius histrio LATREILLE, 1812, p. 689; GUSSAKOVSKIY, 1935, p. 165, 175 [*partim*], 375; STRITT, 1935 a, p. 151; STRITT, 1935 b, p. 189; KLIMA, 1937, p. 55; GREGOR & BAŤA, 1940, p. 219; BERLAND, 1947, p. 46, 58; KONTUNIEMI, 1947, p. 127; HELLÉN, 1948, p. 40; BENSON, 1951, p. 12; CHAMBERS, 1952, p. 136; STRITT, 1952, p. 43; LORENZ & KRAUS, 1957, p. 274; KONTUNIEMI, 1960, p. 63; KONTUNIEMI, 1965, p. 257; ERMOLENKO, 1963, p. 47; WOLF, 1965, p. 459; NUORTEVA, 1971, p. 185; BENEŠ, 1972, p. 46; SCHEDL, 1972, p. 99; MÓCZÁR & ZOMBORI, 1973, p. 31; VERZHUTSKIY, 1973, p. 72 [*partim*]; BENEŠ, 1974, p. 313; PESARINI & PESARINI, 1976, p. 64; ZHELOCHOVTSEV & PROKHOROVA, 1976, p. 99; CHEVIN & BARBIER, 1980, p. 274; SCHEDL, 1980, p. 4; LISTON, 1981, p. 168; QUINLAN & GAULD, 1981, p. 17; VIITASARI, 1982, p. 40, 46, 59; KANGAS, 1985, p. 27; VIITASARI & VIKBERG, 1985, p. 3; WEIFFENBACH, 1985, p. 9; ACHTERBERG & AARTSEN, 1986, p. 30, 39 [*partim*]; CHEVIN, 1987, p. 28; MIDTGAARD, 1987, p. 127; MIDTGAARD *et al.*, 1987, p. 34; CHEVIN, 1988, p. 31; MAGIS, 1988, p. 19; PESARINI & PESARINI, 1988, p. 165; SHINOHARA, 1988 a, p. 110; ZHELOCHOVTSEV, 1988, p. 31; BENEŠ, 1989, p. 14; MAGIS, 1994, p. 8.

For more synonymy and references, see KLIMA (1937).

Distribution. Europe; Korea [new record].

Material examined. Finland: 1 ♀, “P.-Pirkkala, Grönblom, 16. 6. 37”; 1 ♂, “Tampere, ex larva, Grönblom, 27. 2. 1950”. Germany: 1 ♀, “Erzgebirge, Lange”. Korea: 4 ♀, 1 ♂, Mirugam (Puktae-sa), 1300 m, Mt. Odae-san, Kangwon-do, 19–23. V. 1989, A. SHINOHARA; 1 ♀, Chin-kogae, 850 m, Mt. Odae-san, 1. VI. 1992, A. SHINOHARA.

Host-plant. *Populus tremula* (STRITT, 1935 a), ?*Populus nigra* (MIDTGAARD, 1989). All the Korean specimens were swept from the foliage of *Populus* sp. (most probably *P. tremula*).

Remarks. The sawsheath of this species is quite specialized (Fig. 1 B). As correctly illustrated by BENEŠ (1972, fig. 15), it has two peg-like projections in lateral view, but these are not articulated with the main body of sawsheath and are probably the outgrowth of the sawsheath sclerite. The peg is apparently absent in *P. histrio* as in *P. betulae* and *P. festivus*. ACHTERBERG and AARTSEN’s (1986) fig. 206 is incorrect and misleading.

The Korean specimens listed above represent the first record of *P. histrio* from Korea, and, although BENEŠ (1974) and ACHTERBERG and AARTSEN (1986) gave “Eurosiberia” and “Siberia to Kamchatka” besides Europe, respectively, as its distribution, the Korean record is probably the first published collection data from outside Europe. As pointed out by BENEŠ (1972), MALAISE’s (1931) record of this species from Kamchatka actually refers to *P. brevicornis*.

A comparison of the very limited material at hand has suggested the existence of slight differences between European and Korean populations; Korean specimens tend to have larger pale areas on the head and thorax and the dorsal projection of sawsheath a little thicker (compare Fig. 1 B with fig. 15 in BENEŠ, 1972).

Pamphilius pictifrons GUSSAKOVSKIJ

(Figs. 1 C; 3 K, L; 10 A)

Pamphilius pictifrons GUSSAKOVSKIJ, 1935, p. 165, 176, 375, 379; KLIMA, 1937, p. 61; BENEŠ, 1972, p. 46; BENEŠ, 1974, p. 299, 313; VERZHUTSKIJ, 1981, p. 50 [*partim?*].

Distribution. Eastern Siberia and the Far East of Russia.

Material examined. Russia: ♀ (holotype), "lev. b. ust. r. Tauj, Ochotsk. pober., [?], M. Semen.-TSh., 10. VII. 930" "*Pamphilius pictifrons* m. ♀ typus, Gussakovskij det." (ZISP); 1 ♀, "Jakutija, Usty Olëkmy, Troitskoe, Kaimuk, 3. VII. 971" (ZISP).

Host-plant. Unknown.

Remarks. Full description of this species based on the holotype was published by BENEŠ (1974). This species was known only from the holotype and a female from Bajkal region recorded by VERZHUTSKIJ (1981). The latter record, however, probably refers to *P. tricolor*, as discussed under the latter species. The female from Jakutija listed above is the first specimen to be recorded from that region.

Pamphilius gyllenhali (DAHLBOM)

(Figs. 1 D; 5 A–D; 6 A–C; 10 B; 11 A)

Lyda gyllenhali DAHLBOM, 1835, p. 14.

Pamphilius gyllenhali: CONDE, 1934, p. 45; STRITT, 1934, p. 335; GUSSAKOVSKIJ, 1935, p. 165, 176, 375; STRITT, 1935 a, p. 151; STRITT, 1935 b, p. 189; KLIMA, 1937, p. 54; BERLAND, 1947, p. 46, 58; KONTUNIEMI, 1947, p. 127; BENSON, 1951, p. 12; CHAMBERS, 1952, p. 127; STRITT, 1952, p. 43; LORENZ & KRAUS, 1957, p. 275; PRECUPEȚU, 1958, p. 1046; KONTUNIEMI, 1960, p. 63; WEIFFENBACH, 1962, p. 123; KONTUNIEMI, 1965, p. 257; WOLF, 1965, p. 458; NUORTEVA, 1971, p. 185; WOLF, 1971, carte 258; BENEŠ, 1972, p. 46; CHEVIN, 1973, p. 231; MÓCZÁR & ZOMBORI, 1973, p. 31; OOSTSTROOM, 1973, p. 2; VERZHUTSKIJ, 1973, p. 72; BENEŠ, 1974, p. 313; BENEŠ, 1975, p. 123; CASALE & PESARINI, 1976, p. 47; LACOURT, 1976, p. 189; OOSTSTROOM, 1976, p. 4; PESARINI & PESARINI, 1976, p. 64; ZHELOCHOVTSEV & PROKHOROVA, 1976, p. 99; CHEVIN & BARBIER, 1978, p. 119; SCHEDL, 1980, p. 4; ZOMBORI, 1980, p. 62; CHEVIN, 1981, p. 43; LISTON, 1981, p. 168; QUINLAN & GAULD, 1981, p. 16; VERZHUTSKIJ, 1981, p. 49 [*partim?*]; VIITASAAI, 1982, p. 40, 46, 60; KANGAS, 1985, p. 27; VIITASAAI & VIKBERG, 1985, p. 3; WEIFFENBACH, 1985, p. 8; ACHTERBERG & AARTSEN, 1986, p. 31, 39; MIDTGAARD, 1987, p. 128; MIDTGAARD *et al*, 1987, p. 35; CHEVIN, 1988, p.

31; MAGIS, 1988, p. 18; PESARINI & PESARINI, 1988, p. 165; ZHELOCHOVTSEV, 1988, p. 31; BENEŠ, 1989, p. 14; PÁDR, 1990, p. 397; MAGIS, 1994, p. 8.

For more synonymy and references, see KLIMA (1937).

Distribution. Europe.

Material examined. Norway: 1 ♀, "EIS 28, AK Bærum, Ostøya, 30. V.–10. VI. 1984, leg. F. Midtgaard". Finland: 1 ♀, "U. Helsinki, 22/5, 1963, leg. Kontuniemi, e. l. *S. caprea*"; 1 ♀, "EH, Pälkäne, ex larva, 26. 5. 1975, 15/74, leg. J. Kangas, *Salix caprea*"; 1 ♂, "EH, Pälkäne, ex larva, 27. 5. 1958, 509, leg. J. Kangas, (*Salix caprea*)"; 1 ♂, "EH, Pälkäne, ex larva, 29. 5. 1970, 15/69, leg. J. Kangas"; 1 ♂, "EH, Pälkäne, ex larva, 20. 4. 1964, leg. M. Viitasaari, *Salix caprea*". Germany: 1 ♀, "Raitmes" "coll. Konow"; 1 ♀, "Potsdam" "Sammlung Dr. Enslin".

Host-plant. *Salix caprea* (STRITT, 1934), *Salix aurita* (CONDE, 1934), *Salix atrocinerea* (CHAMBERS, 1952), *Salix cinerea*, *Salix myrsinifolia* (KONTUNIELMI, 1960), *Salix phylicifolia* (KANGAS, 1985).

Remarks. This species is probably restricted in distribution to Europe. VERZHUTSKIJ (1981) recorded this species from "Krasnojarskij kr. (Chunojar)" in eastern Siberia based on larvae feeding on *Salix*, but circumstantial evidence suggests a high possibility that these larvae actually belonged to *P. tricolor* (see remarks under *P. tricolor*).

Pamphilius tricolor BENEŠ

(Figs. 5 E–J; 6 D–F; 11 B)

?*Pamphilius* sp. on *Salix*: OKUTANI, 1957, p. 16; OKUTANI, 1959, p. 189; SHINOHARA & OKUTANI, 1983, p. 280.

Pamphilius tricolor BENEŠ, 1974, p. 301, 313.

Pamphilius fauni ZHELOCHOVTSEV, 1976, p. 76; ZHELOCHOVTSEV & LOBKOVÁ, 1981, p. 147. [Nom. nud.]

?*Pamphilius gyllenhali*: VERZHUTSKIJ, 1981, p. 49. [Nec DAHLBOM, 1835; *partim*.]

?*Pamphilius pictifrons*: VERZHUTSKIJ, 1981, p. 50. [Nec GUSSAKOVSKIJ, 1935; *partim*.]

Pamphilius sp.: TOGASHI, 1983, p. 9.

Female. Described in detail by BENEŠ (1974).

Male (hitherto undescribed). Length 9–11 mm. Head black, with rich pale yellow marking as in Fig. 11 B; malar space and gena entirely pale yellow; mandible pale yellow, with large part of basal tooth black and apex rufous; antennal scape entirely yellow; pedicel and flagellum brown, becoming blackish toward apex. Thorax black with the following parts pale yellow: most of lateral pronotum, broad posterior margin (interrupted at middle) of dorsal pronotum, ventral half of cervical sclerite, tegula, posterior half to 2/3 of mesoscutal median

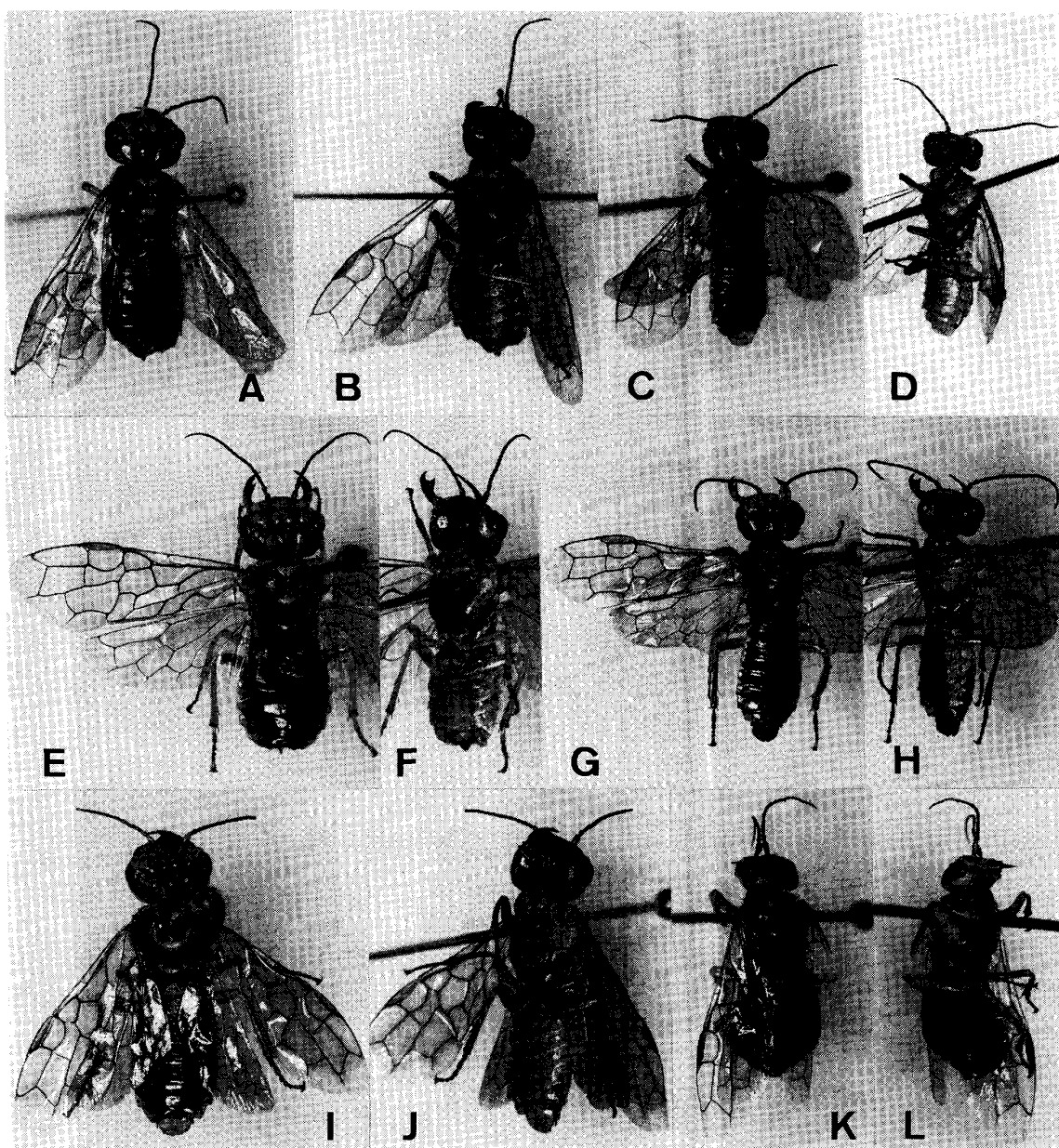


Fig. 5. *Pamphilius* spp. A, B, *P. gyllenhali*, ♀, Pälkäne, Finland; C, D, *ibid.*, ♂, Pälkäne, Finland; E, F, *P. tricolor*, ♀, Yamada-onsen, Japan; G, H, *ibid.*, ♂, Mirugam, Korea; I, J, *ibid.*, ♂, Hiuchi-toge, Japan; K, L, *P. infuscatus*, ♀, paratype, Greenville, U.S.A.

lobe and spot on lateral lobe lateral to it, mesoscutellum and large spot on mesoscutal lateral lobe anterolateral to it, entire mesepisternum, except for very narrow posterior margin and spot at posterolateral corner of preepisternum, broad dorsoposterior margin of mesepimeron, metascutellum, most of metepisternum, dorsoposterior half to 2/3 of metepimeron. Legs pale yellow, with very narrow coxal bases black. Wings hyaline, weakly stained with blackish brown, more strongly so in apical part of hindwing; stigma yellow, with anterior and

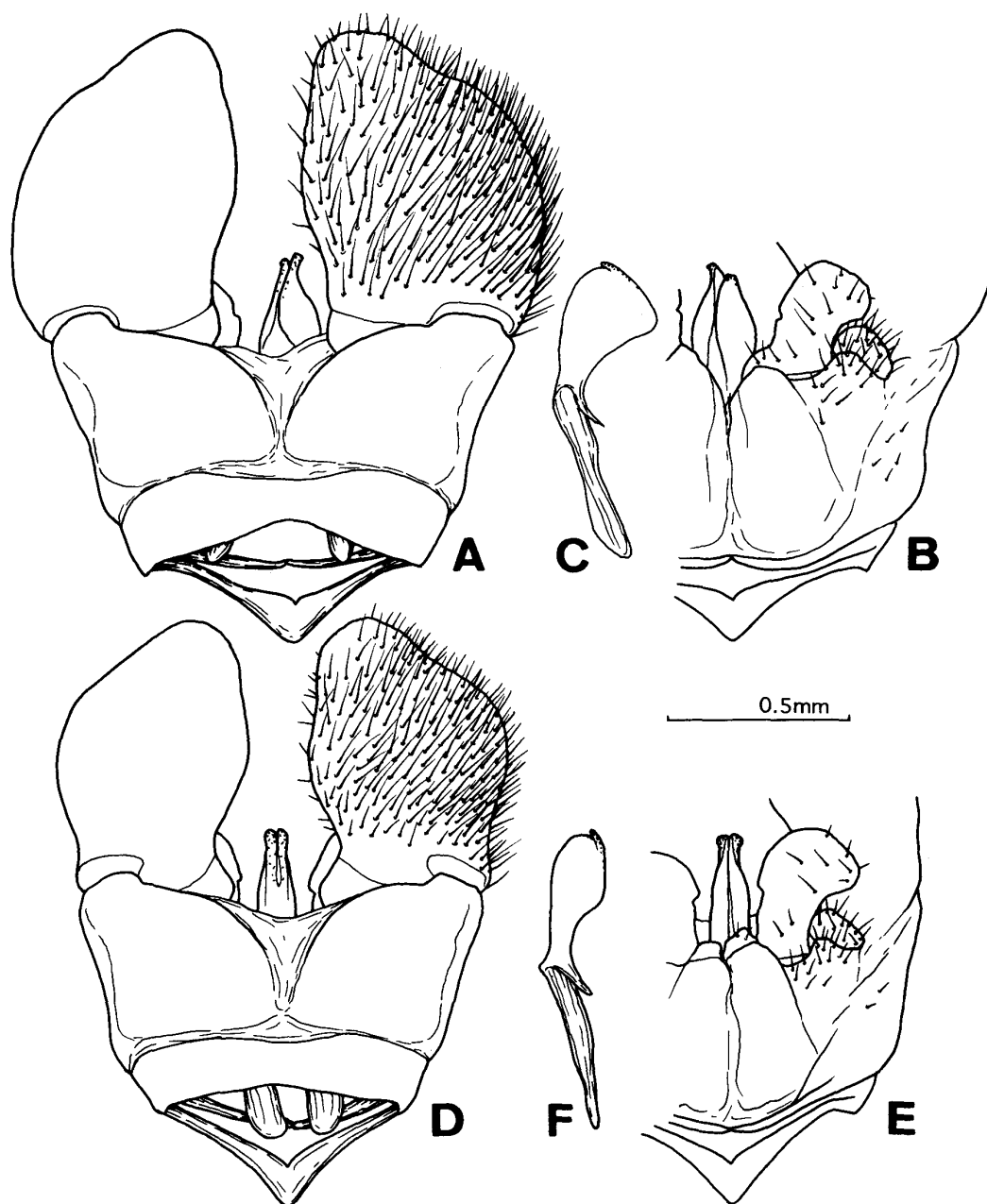


Fig. 6. Male genitalia, *Pamphilius gyllenhali*, Pälkäne, Finland (A–C) and *P. tricolor*, Mirugam, Korea (D–F). A, D, Dorsal view; B, E, ventral view; C, F, penis valve, lateral view.

posterior margins blackish brown (posterior margin, particularly in basal part, often with creamy whitish pigmentation); veins blackish brown, with C, Sc and part of veins in basal 1/3 of forewing yellow. Abdominal dorsum black, with narrow lateral margins pale yellow, more broadly so on posterior segments, posterior margin of 8th tergum pale yellow, and posterior half of 4th to 6th terga (and often part of 7th and sometimes small part of 3rd terga) orange; venter

usually entirely pale yellow.

Upper frons below ocelli very strongly roundly convex, with rather deep median notch reaching median fovea; ocellar basin triangular in outline, with anterolateral extension nearly reaching antennal furrow; median fovea small, punctiform; frontoclypeal crest low, very bluntly carinate; facial crest very strongly convex, rounded. Upper part of head behind transverse and lateral transverse sutures, upper part of frons and paraantennal field rather smooth, weakly coriaceous, with very sparse, ill-defined punctures; ventral part of paraantennal field quite smooth and impunctate; area from facial crest to lateral transverse suture shallowly rugose; supraclypeal area and clypeus somewhat rugose and coriaceous, with rather dense, generally large and deep, irregular punctures all over; gena somewhat rugose and coriaceous, with rather sparse, shallow, ill-defined punctures; head nearly glabrous before crassa, except for distinctly pilose gena. Antennae with 18–20 segments; 3rd segment 1.8–2.2 times as long as 4th; apex of 3rd segment oblique. Tarsal claw with rounded basal lobe and inner tooth distinctly shorter than outer one. Subgenital plate with posterior margin broadly rounded, rather narrowly truncate at apex. Genitalia as in Fig. 6 D–F.

Distribution. Eastern Siberia and the Far East of Russia, westward to Krasnojarskij kraj and eastward to Kamchatka; Korea [new record]; Japan (Hokkaido, Honshu) [new record].

Material examined. Russia: ♀ (holotype), “Irkutsk r. i., s. M. Goloustnoe, s. *Rosa acicularis*, B. Verzhutskij, 10. VI. 68” “*Pamphilius tricolor* sp. n., ♀, det. Beneš, 1973” “Holotype” (MU); 1 ♀, “Tuva, M Enisej, Bojarovka, 22. VI. 1949, Perevozchikova,” “*Pamphilius tricolor* Beneš, Zinovjev det. = *fauni* Zh. n. nud.” (MU); 1 ♀, “Ts. Jakutija, r. Aldan, s. Megino-Aldan, 20km nizhe ust’ ja Amgi, Kajmuk, 24. VI. 1981” (ZISP); 1 ♀, “Krasnojarsk. kraj, st. Chunojar, soskovka, s. *Rubus idaeus* v Tajge, B. Verzhutskij, 2. VII. 75” (BVI); 1 ♀, “Bur. ASSR, Tunkinskij r-n. s. Zun-Murino, s *Salix* na opushke lesa, T. Dokijchuk, 9. VI. 70” (BVI); 2 ♀, Sosninskij River, 5 km SW of Bychikha, Bol’shekhkhtsirskij Reserve, Khabarovskij kraj, 12–14. VI. 1994, A. SHINOHARA. Korea: 1 ♂, Mirugam (Puktae-sa), 1300 m, Mt. Odae-san, Kangwon-do, 26. V. 1989, A. SHINOHARA; 1 ♂, same data except for 13–16. V. 1990; 1 ♀, same data except for 31. V. 1991; 2 ♀, 14 ♂, same data except for 30–31. V. 1992; 1 ♀, 74 ♂, same data except for 27. V.–1. VI. 1993. Japan: 1 ♀, Nukabira, 600–700 m, Tokachi, Hokkaido, 20. VI. 1979, A. SHINOHARA; 1 ♂, Yamada-onsen, 800 m, Tokachi, Hokkaido, 21. VI. 1990, A. SHINOHARA; 1 ♀, same data except for 21–25. VI. 1992; 1 ♂, Nakayama-toge, 800 m, Shiribeshi, Hokkaido, 26. VI. 1991, A. SHINOHARA; 1 ♂, “Hiuchi-toge, M-Echigo [Niigata Pref., Honshu], 20. VI. 1981, Coll. K. Baba”.

Host-plant. Unknown, but probably *Salix* (see remarks below).

Remarks. This species, described on the basis of one female from Irkutsk, is now known to occur widely in northeastern Asia. This is the first record from Korea and Japan.

The only specimen available from Honshu, Japan, is an extraordinarily large male, about 12 mm long, well exceeding all the 92 Korean and Hokkaido males examined, whose length ranges from 9 to 11 mm. Apart from this large gap in size, however, I was unable to find any significant differences between the Honshu specimen and the males from Korea and Hokkaido.

The name "*Pamphilius fauni* Zhel." was mentioned by ZHELOCHOVTSEV (1976) and ZHELOCHOVTSEV and LOBKOVÁ (1981), but it is a manuscript name and the specimens determined as "*fauni*" belong to *P. tricolor* (A. ZINOVJEV, pers. comm.).

VERZHUTSKIY (1981) recorded *P. gyllenhali*, a European species closely related to *P. tricolor*, from "Krasnojarskij kr. (Chunojar)" in eastern Siberia, stating that it is "ves'ma obychny" [very common]. His report was based on the discovery of 28 larvae solitarily feeding on the leaves of *Salix caprea* each in a leaf-roll. I have examined a female specimen of *P. tricolor* collected by VERZHUTSKIY in Chunojar but no specimens of *P. gyllenhali* from that locality or any other areas outside Europe. In Hokkaido, unidentified larvae solitarily feeding on *Salix* sp. make spiral leaf-rolls closely similar to those of *P. gyllenhali* (OKUTANI, 1957, 1959; SHINOHARA & OKUTANI, 1983). It seems probable to me that the larvae on *Salix* found both in eastern Siberia and Hokkaido belong to *P. tricolor*.

VERZHUTSKIY (1981) also recorded *P. pictifrons* from Bajkal region based on a female specimen with the data "Pribajkal'e (d. Goloustnoe)" "10. VI. 1968, on wild rose" [original in Russian]. These data are exactly the same as those for the holotype of *P. tricolor*, which was described from one female collected by VERZHUTSKIY. BENES's important paper including the original description of *P. tricolor* was published in 1974, but strangely enough it was not cited by VERZHUTSKIY (1981). It is quite possible that the VERZHUTSKIY's specimen of "*P. pictifrons*" from Goloustnoe is actually the holotype of *P. tricolor*.

Pamphilius infuscatus MIDDLEKAUFF

(Fig. 5 K, L)

Pamphilius infuscatus MIDDLEKAUFF, 1964, p. 24; SMITH, 1979, p. 15.

Distribution. North America (British Columbia to Quebec, Maine).

Material examined. 1 ♀ (paratype), "Greenville, Maine, VI-1-32" "Paratype, *Pamphilius infuscatus* Middlekauff, ♀" (USNM).

Host-plant. *Populus tremuloides* (MIDDLEKAUFF, 1964).

Remarks. This is the only Nearctic species of the *histrio* group so far recognized. For a description, see MIDDLEKAUFF (1964).

***Pamphilius borisi* BENEŠ**

(Fig. 7 A, B)

Pamphilius borisi BENEŠ, 1972, p. 51; BENEŠ, 1974, p. 313; VERZHUTSKIJ, 1981, p. 49.

Distribution. Eastern Siberia (Bajkal region).

Material examined. 1 ♀, "O. Bajkal, st. Angasolka, s. vody, 29. VI. 1969, B. Verzhutskij".

Host-plant. Unknown.

Remarks. This species was known only from the holotype obtained in the vicinity of Irkutsk, which was described in detail by BENEŠ (1972). The female listed above differs from the holotype in the shape of sawsheath; BENEŠ's (1972) fig. 14 shows that the holotype has the dorsal part of sawsheath convex above the peg in lateral view, but the convexity is much less conspicuous in my specimen.

***Pamphilius virescens* MALAISE**

(Figs. 1 E; 7 C–F; 8 A–C; 10 C; 11 C)

Pamphilius virescens MALAISE, 1931, p. 62; GUSSAKOVSKIJ, 1935, p. 164, 174, 375; KLIMA, 1937, p. 68; VERZHUTSKIJ, 1966, p. 27; BENEŠ, 1972, p. 46; BENEŠ, 1974, p. 303, 311.

Distribution. Eastern Siberia (Bajkal region); Russian Far East (Kamchatka); Korea [new record]; Japan (Hokkaido) [new record].

Material examined. Russia: ♀ (holotype), "Kamtschatka, Malaise" "Typus" "*Pamphilius virescens* Mal. Type Malaise det." "818" (NRS); ♂ (allotype), "Kamtschatka, Malaise" "2592" "Allotypus" "*Pamphilius virescens* sp. n." (NRS). Korea: 4 ♂, Mirugam (Puktae-sa), 1300 m, Mt. Odae-san, Kangwondo, 30–31. V. 1992, A. SHINOHARA; 2 ♀, 3 ♂, same data except for 29. V.–1. VI. 1993. Japan (Hokkaido): 1 ♀, Yamada-onsen, 800 m, Tokachi, 21. VI. 1990, A. SHINOHARA.

Host-plant. Unknown. VERZHUTSKIJ (1966) gave a collection record of a female from *Salix* at Tibelti in Bajkal region, and noted that this species should be associated with *Salix* because he was unable to find any other likely host-plants nearby. The Korean specimens were all swept from foliage of *Betula* and *Salix*, and one Japanese specimen examined was found on *Alnus*.

Remarks. This species was originally described from Kamchatka (MALAISE, 1931) and later recorded from Bajkal region (VERZHUTSKIJ, 1966). The specimens from Korea and Japan listed above represent the first record from both of the areas. Full description of the both sexes was given by BENEŠ (1974).

The two venational characters cited by BENEŠ (1974) as important for recognizing this species, *i.e.*, “short vein Sc1 and recurved vein Cu1-a” in the forewing, are quite variable in my material.

***Pamphilius brevicornis brevicornis* HELLÉN**

(Figs. 7 G–J; 8 D–F; 10 D)

Pamphilius histrio: MALAISE, 1931, p. 63; GUSSAKOVSKIJ, 1935, p. 175 [*partim*]; VERZHUTSKIJ, 1973, p. 72 [*partim*]. [*Nec* LATREILLE, 1812.]

Pamphilius histrio var. *brevicornis* HELLÉN, 1948, p. 40.

Pamphilius brevicornis: KONTUNIEMI, 1958, p. 90, 94; KONTUNIEMI, 1960, p. 63; KONTUNIEMI, 1965, p. 257, 262; BENEŠ, 1972, p. 47; BENEŠ, 1974, p. 313; BENEŠ, 1975, p. 123; VERZHUTSKIJ, 1981, p. 49; VIITASAARI, 1982, p. 40, 59; KANGAS, 1985, p. 28; VIITASAARI & VIKBERG, 1985, p. 3; ACHTERBERG & AARTSEN, 1986, p. 30, 38; MAGIS, 1988, p. 18; ZHELOCHOVTSEV, 1988, p. 30; BENEŠ, 1989, p. 14; SHINOHARA & TAEGER, 1990, p. 90; MAGIS, 1994, p. 8.

Distribution. Europe; eastern Siberia (Bajkal region); Russian Far East (Primorskij kraj, Kamchatka); Korea [new record].

Material examined. Russia: 1 ♀, “Suputinsk. Zapov., ot. Rasnitsina” (MU); 2 ♀, 1 ♂, “Kamchatka, Mil’kovo, Bereznjak, Kasparian, 7. VII. 1985” (ZISP & NSMT); 1 ♀, “Kamchatka, Kozyrevsk, sm. les, 17. VII. 1985, Belokobyl’skij” (ZISP); 1 ♂, “Kamchatka, Kozyrevsk, Bereznjak, 12. VII. 1985” Belokobyl’skij” (ZISP); 1 ♀, “Kamtschatka, Malaise” ”1000” “3 Fühlerglied nicht so lang als die 2 folgenden” “*Pamphilius histrio*” “192, 70” “462, 81” “*Pamphilius brevicornis* Hell. ♀, det. Beneš, 1970” (NRS); 1 ♂, “Kamtschatka, Malaise” “866” “3ie und 4ie Fühlerglied gleichlang” “*P. brevicornis* Hell., det. Beneš, 1970” (NRS). Korea: 2 ♂, Mirugam (Puktae-sa), 1300m, Mt. Odae-san, Kangwon-do, 31. V.–1. VI. 1993, A. SHINOHARA.

Host-plant. Unknown.

Remarks. BENEŠ (1972) fully described both the sexes of this widely distributed species. The Korean males examined, representing the first record of this species from Korea, are quite similar to the specimens from Kamchatka.

***Pamphilius brevicornis ibukii* subsp. nov.**

(Figs. 7 K, L; 9 A, B; 10 E; 11 D)

Length 13 mm in female, 11–11.5 mm in male. Head color patterns as in Figs. 10 E & 11 D. Differs from the nominotypical subspecies as follows (character states of the nominotypical subspecies are in parentheses): Longitudinal furrow on upper part of frons extending from ocellar basin to median fovea rather shallow, sometimes indistinct (deep and sharply defined); upper part of

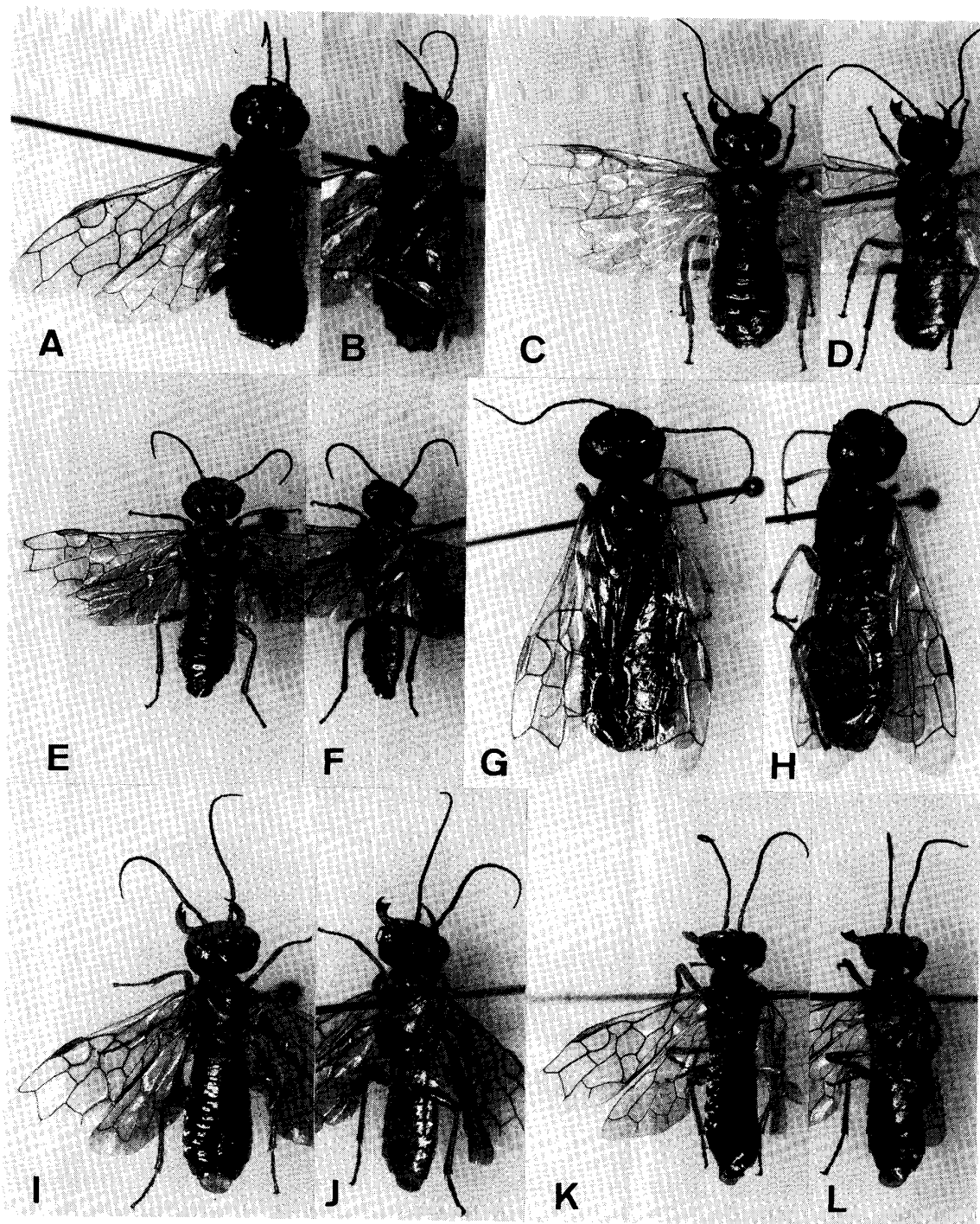


Fig. 7. *Pamphilius* spp. A, B, *P. borisi*, ♀, Bajkal, Russia; C, D, *P. virescens*, ♀, Yamadaonsen, Japan; E, F, *ibid.*, ♂, Mirugam, Korea; G, H, *P. brevicornis brevicornis*, ♀, Mil'kovo, Kamchatka, Russia; I, J, *ibid.*, ♂, Mirugam, Korea; K, L, *P. brevicornis ibukii*, ♂, paratype, Nakayama-toge, Japan.

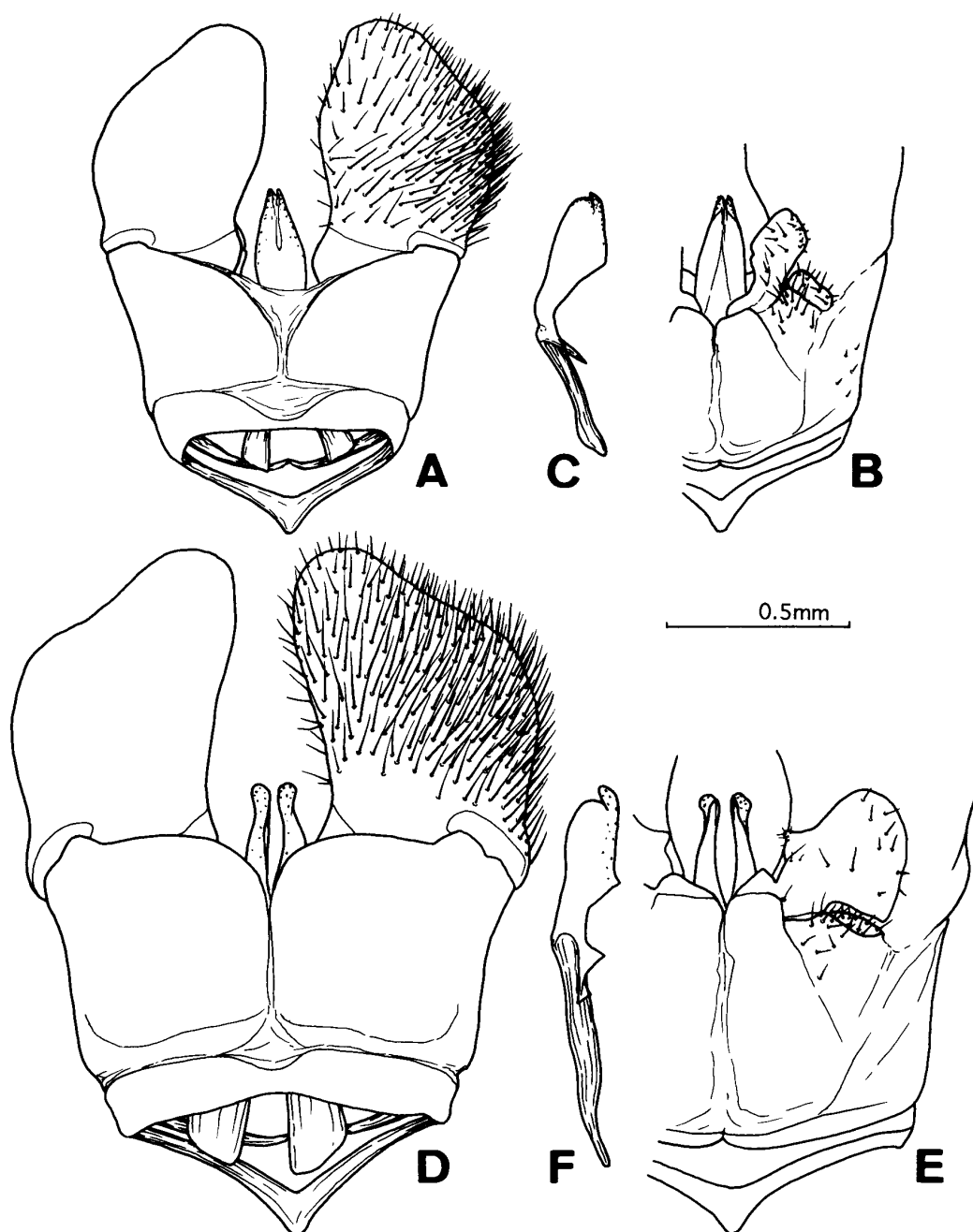


Fig. 8. Male genitalia, *Pamphilius virescens*, Mirugam, Korea (A–C) and *P. brevicornis brevicornis*, Mirugam, Korea (D–F). A, D, Dorsal view; B, E, ventral view; C, F, penis valve, lateral view.

paraantennal field and frons more or less coriaceous, often only weakly shining (quite smooth, rather strongly shining) [difference less distinct in females]; postocellar area usually entirely black (with yellow posterolateral spots); gena in female mostly black (mostly yellow); antennal scape in male often with black

spot above (without black spot); 3rd antennal segment in male 1.2–1.3 times as long as 4th (1.0–1.2 times); in female, cervical sclerite, mesopleuron, metanotum and metapleuron entirely black (with large yellow marks); mesoscutal median lobe in female with only narrow posterior corner yellow (posterior half yellow); mesoscutal lateral lobe mostly or entirely black (with large paired yellow spots); stigma with anterior and posterior margins blackish brown (entirely dark yellow); in male, 3rd, 7th and 8th abdominal terga largely black dorsally (largely orange), and in female 7th and 8th terga with more black areas.

Distribution. Japan (Hokkaido, Honshu).

Holotype: ♀, Mt. Hakusan, Ishikawa Pref., Honshu, 13. VI. 1975, I. TOGASHI.

Paratypes: 1♂, Nakayama-toge, 800 m, Shiribeshi, Hokkaido, 26. VI. 1987, A. SHINOHARA; 1♂, Yamada-onsen, 800 m, Tokachi, Hokkaido, 21. VI. 1990, A. SHINOHARA; 1♂, Horoshika-toge, 1100 m, Tokachi, Hokkaido 9. VII. 1994, A. SHINOHARA; 1♀, Utsukushinomori, Mts. Yatsugatake, Yamanashi Pref., Honshu, 31. VII. 1973, S. IBUKI.

Etymology. This new subspecies is named after my friend, Mr. Shin-ichi IBUKI, who collected the first specimen of this subspecies.

Remarks. This is a dark-colored geographic form occurring in Japan. BENEŠ's (1972) description of the nominotypical subspecies mostly applies to this subspecies, except for the differences mainly in coloration as given above.

Pamphilius maximus sp. nov.

(Figs. 1 F; 9 C, D; 10 F)

Female (holotype). Length 15.5 mm. Head pale yellow before crassa, with brown and black marks as in Fig. 10 F; head behind crassa mostly black; gena and malar space pale yellow; mandible pale yellow basally, black medially, and rufous apically; antenna pale brown, slightly darkened toward apex, apical part of scape yellow and radicle marked with black. Thorax black with the following parts pale yellow: lateral pronotum, posterior half of dorsal pronotum, cervical sclerite (except for dorsal part), tegula, mesoscutal median lobe (except for anterior part), mesoscutellum, large rectangular mark on mesoscutal lateral lobe one each anterolateral to mesoscutellum, large mark on mesepisternum extending from anterior to posterior margins, spot on ventral median line of mesothorax, very narrow line along outer margin of mesopreepisternum, large mark on mesepimeron, large median and lateral parts of metanotum, metascutellum, metepisternum (except for ventral part) and metepimeron (except for small dorsal and ventral parts). Legs yellow, with very narrow coxal bases black. Wings hyaline, distinctly stained with brown; veins blackish brown, with veins C,

Sc and R (except for apical part) pale brown, and veins in basal part of wings more or less pale; stigma pale brown, with narrow anterior margin dark brown. Abdomen brown above and dirty yellow below, with the following black: propodeum (except for laterotergites), medially constricted band at anterior margin of each tergum (largely concealed under preceding segment in posterior segments and almost invisible), and anterior part of 2nd sternum.

Upper frons below ocelli strongly convex, with deep, sharply defined longitudinal furrow extending from ocellar basin to large deep punctiform median fovea; ocellar basin represented by deep broad furrow around median ocellus and its anterolateral extensions reaching antennal furrows; frontoclypeal crest rounded; facial crest very strongly roundly inflated. Clypeus and ventral part of frons coriaceous with rather dense irregular punctures, lateral parts of clypeus rugose; area from facial crest to lateral transverse suture rugose; posterior margin and ventral part of gena more or less rugose; head otherwise smooth, polished with sparse small inconspicuous punctures. Head glabrous, except for sparsely pilose clypeus and gena. One intact but abnormally segmented antenna with 25 or 26 segments, with 3rd segment about 1.7 times as long as 4th. Tarsal claw with inner tooth smaller and shorter than outer one. Sawsheath (Fig. 1 F) with small and glabrous peg.

Male. Unknown.

Distribution. Russian Far East (Primorskij kraj); Korea.

Holotype: ♀, Mirugam (Puktae-sa), 1300 m, Mt. Odae-san, Kangwon-do, 10. VI. 1987, A. SHINOHARA.

Paratype: 1 ♀, "Sikhote-Alin", verch. Majkhe, 26/VI, 1929, N. Filippov," "*Pamphilius histrio* Latr., V. Gussakovsk." (MU).

Variation. The paratype measures only 13 mm, but it is largely due to unnatural shrinking of the abdomen, suggesting that the specimen was once kept in alcohol before being dried. Both the antennae lack apical segments; the 3rd segment is about 1.8 times as long as 4th. In coloration, the paratype has more pale yellow areas on the thorax; the rectangular mark on the mesoscutal lateral lobe extends anteriorly to the pale area of the median lobe, the large mark in the lateral part of the mesepisternum extends ventrally so as to fuse along the median line of the mesothorax, and the line along outer margin of the mesopreepisternum is broader.

Host-plant. Unknown. The holotype female was found crawling on a leaf of *Populus* sp. (probably *P. davidiana*), which may be the host-plant.

Etymology. The specific name is a Latin word meaning "the largest".

Remarks. This new species is well characterized by its large size (the holotype, measuring 15.5 mm, is the largest specimen of *Pamphilius* I have ever seen), pale coloration, short 3rd antennal segment (1.7–1.8 times as long as the 4th), small inner tooth of tarsal claw, and small and glabrous sawsheath peg

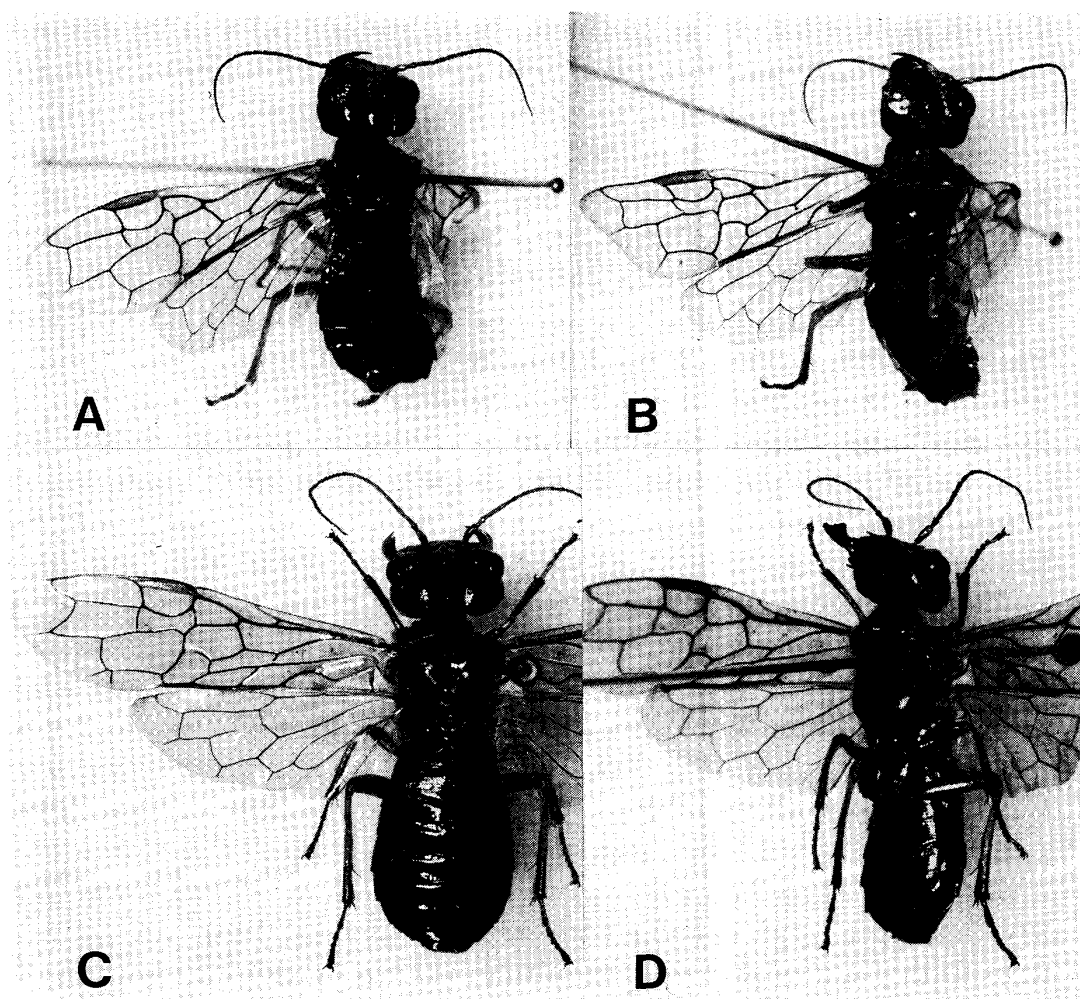


Fig. 9. *Pamphilius* spp., ♀, holotypes. A, B, *P. brevicornis ibukii*; C, D, *P. maximus*.

(Fig. 1 F). It is one of the two species representing the *brevicornis* subgroup (see p. 40), but differs from *P. brevicornis* in paler color pattern (upper part of head with more black area and abdominal dorsum with anterior margin of each segment more extensively black in *P. brevicornis*) and longer 3rd antennal segment (about 1.3–1.4 times as long as 4th in *P. brevicornis*).

Key to Species and Subspecies

Females

1. Head orange all over, except for black ocellar spot and occiput; mesothorax and metathorax entirely black; wings with distinct blackish pattern (Fig. 3 A, B, E, F)..... 2
- Head with more black areas; mesothorax and metathorax marked with yellow; wings subhyaline, without distinct blackish pattern..... 3

2. Lateral parts of 6th–7th terga (including laterotergites) and 5th–6th sterna orange; occiput and cervical sclerite mostly orange; forewing with apical infuscated mark extending towards base (cells 1M, Cu1b, 2M+Cu1, DA and PA more or less infuscated)..... *P. betulae*
- Lateral parts of 6th–7th terga and 5th–6th sterna black; occiput and cervical sclerite mostly black; forewing with infuscated mark restricted to apical part (cells 1M, Cu1b, 2M+Cu1, DA and PA hyaline).....
..... *P. festivus*
3. Third antennal segment 1.3–1.4 times as long as 4th 4
- Third antennal segment 1.7–2.5 times as long as 4th 6
4. Sawsheath peg large, roundly convex, glabrous; clypeus smooth, with scattered small punctures; tarsal claw with inner tooth stout, about as long as outer one.....*P. borisi*
- Sawsheath peg small, with short pubescence; clypeus dull and rugose, coarsely punctured; tarsal claw with inner tooth slightly shorter and thinner than outer one *P. brevicornis*..... 5
5. Head color pattern as in Fig. 10 D; gena mostly yellow; cervical sclerite, mesoscutal lateral lobes, mesopleuron, metanotum and metapleuron with large yellow marks (Fig. 7 G, H)..... *P. brevicornis brevicornis*
- Head color pattern as in Fig. 10 E; gena mostly black; cervical sclerite, mesoscutal lateral lobes, mesopleuron, metanotum and metapleuron entirely black (Fig. 9 A, B)..... *P. brevicornis ibukii*
6. Sawsheath peg large, roundly convex, glabrous (Fig. 1 D) 7
- Sawsheath peg not large and roundly convex but cylindrical or small, often with short pubescence (Fig. 1 C, E, F)..... 9
7. Antennal scape usually entirely yellow; clypeus, gena, mesepisternum and metepisternum largely black (Figs. 5 A, B; 10 B) *P. gyllenhali*
- Antennal scape mostly black; clypeus, gena, mesepisternum and metepisternum largely yellow (Fig. 5 E, F, K, L) 8
8. Postocellar area marked with yellow laterally; mesoscutal lateral lobe with large yellow mark; mesoscutellum and metascutellum entirely yellow (Fig. 5 E)..... *P. tricolor*
- Postocellar area, mesoscutal lateral lobe and metascutellum entirely black; mesoscutellum black with small pale spot laterally (Fig. 5 K).....
..... *P. infuscatus*
9. Antennal scape with at least inner half black; smaller species, 10–11 mm 10
- Antennal scape entirely yellow or pale brown; larger species, 12–15 mm 11
10. Head color pattern as in Fig. 10 A; pale color not greenish; 3rd antennal segment 2.3 times as long as 4th; tarsal claw with inner tooth longer and

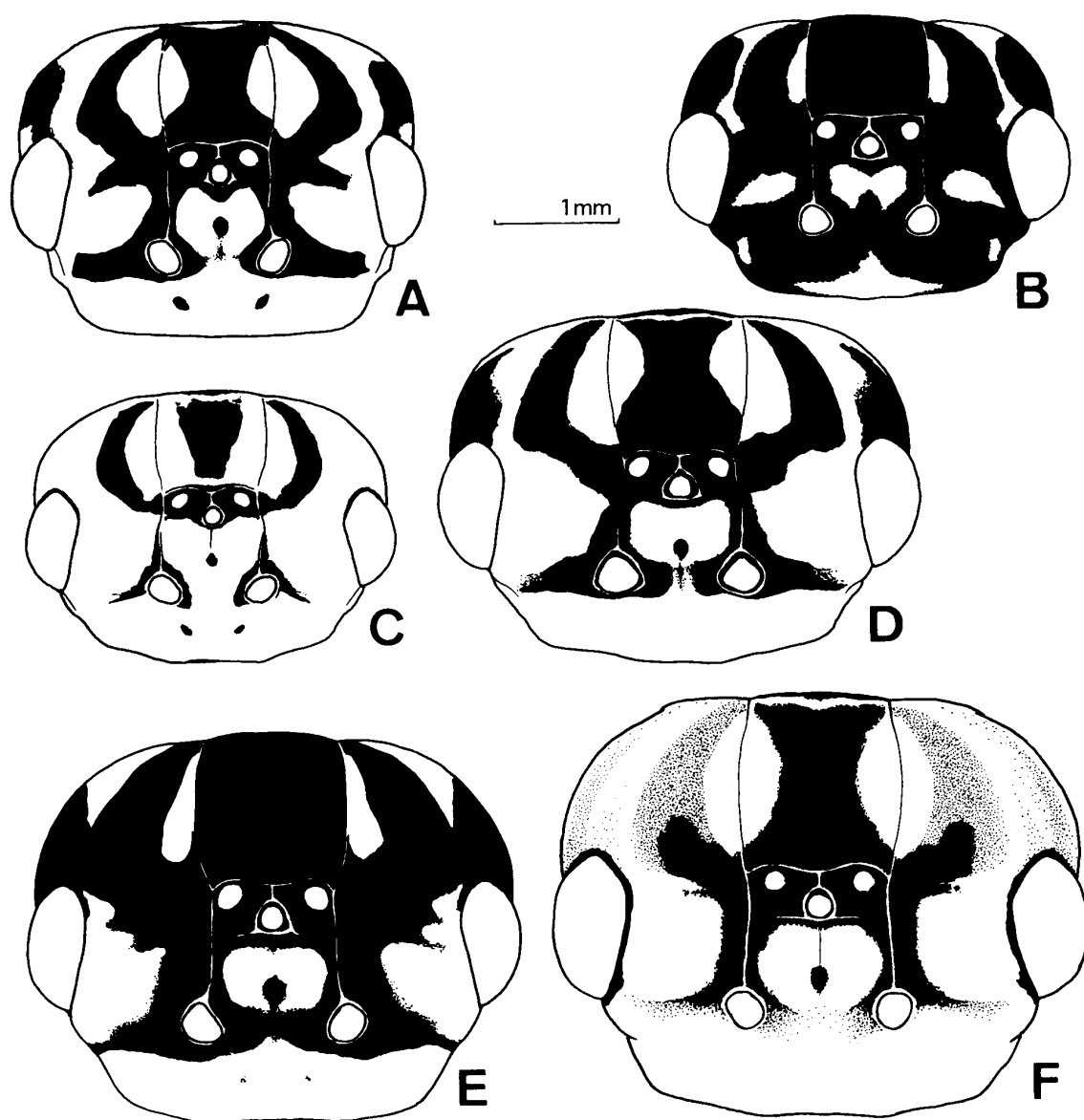


Fig. 10. Heads, ♀. A, *Pamphilius pictifrons*, Troitskoe, Jakutija, Russia; B, *P. gyllenhali*, AK Bærum, Norway; C, *P. virescens*, Yamada-onsen, Japan; D, *P. brevicornis brevicornis*, Kozyrevsk, Kamchatka, Russia; E, *P. brevicornis ibukii*, holotype; F, *P. maximus*, holotype.

- much thicker than outer one; sawsheath peg directed behind, setose (Fig. 1 C)..... *P. pictifrons*
- Head color pattern as in Fig. 10 C; pale color often greenish; 3rd antennal segment 1.9–2.1 times as long as 4th; tarsal claw with inner tooth shorter and not much thicker than outer one; sawsheath peg directed below, glabrous (Fig. 1 E)..... *P. virescens*
11. Clypeus only shallowly sculptured, shining; 3rd antennal segment 2.0–2.4

- times as long as 4th; tarsal claw with inner tooth longer and much thicker than outer one; most of 2nd and 3rd abdominal terga, basal parts of 7th and 8th terga, and often also mediobasal parts of 4th to 6th terga black (Fig. 3 G) *P. histrio*
- Clypeus distinctly rugose, dull; 3rd antennal segment 1.7–1.8 times as long as 4th; tarsal claw with inner tooth shorter and not much thicker than outer one; 2nd to 9th abdominal terga mostly orange (Fig. 9 C).....
..... *P. maximus*

Males (*P. infuscatus* not included)

1. Dorsum of thorax entirely black (Fig. 3 C); 3rd antennal segment 1.5–1.7 times as long as 4th; genitalia as in Fig. 4 A–C *P. betulae*
- Dorsum of thorax marked with yellow, at least posterior half of mesoscutal median lobe and mesoscutellum yellow (e.g., Fig. 3 I); 3rd antennal segment 1.0–1.3 or 1.8–2.3 times as long as 4th 2
2. Third antennal segment 1.0–1.3 times as long as 4th; genitalia as in Fig. 8 D–F.....*P. brevicornis*..... 3
- Third antennal segment 1.8–2.3 times as long as 4th..... 4
3. Scape without black spots; postocellar area with yellow posterolateral spots; mesoscutal lateral lobe with large paired yellow spots; stigma entirely dark yellow (Fig. 7 I); 3rd antennal segment 1.0–1.2 times as long as 4th *P. brevicornis brevicornis*
- Scape usually with black spot above; postocellar area usually entirely black (Fig. 11 D); mesoscutal lateral lobe mostly or entirely black; stigma with anterior and posterior margins blackish brown (Fig. 7 K); 3rd antennal segment 1.2–1.3 times as long as 4th..... *P. brevicornis ibukii*
4. Tarsal claw with inner tooth longer and much thicker than outer one; genitalia as in Fig. 4 D–F..... *P. histrio*
- Tarsal claw with inner tooth shorter and not much thicker than outer one 5
5. Head color pattern as in Fig. 11 C; oblong yellow mark at lateral margin of postocellar area reaching transverse suture and extending inward along the suture, often fused at middle; genitalia as in Fig. 8 A–C.....
..... *P. virescens*
- Head color pattern as in Fig. 11 A, B; oblong yellow mark at lateral margin of postocellar area missing or restricted to posterior part, not reaching transverse suture 6
6. Clypeus with rather smooth, shining space between punctures; postocellar area entirely black (Fig. 11 A); mesoscutal lateral lobe and mesepimeron mostly black, with small yellow marks, if any (Fig. 5 C, D); genitalia as in Fig. 6 A–C *P. gyllenhali*

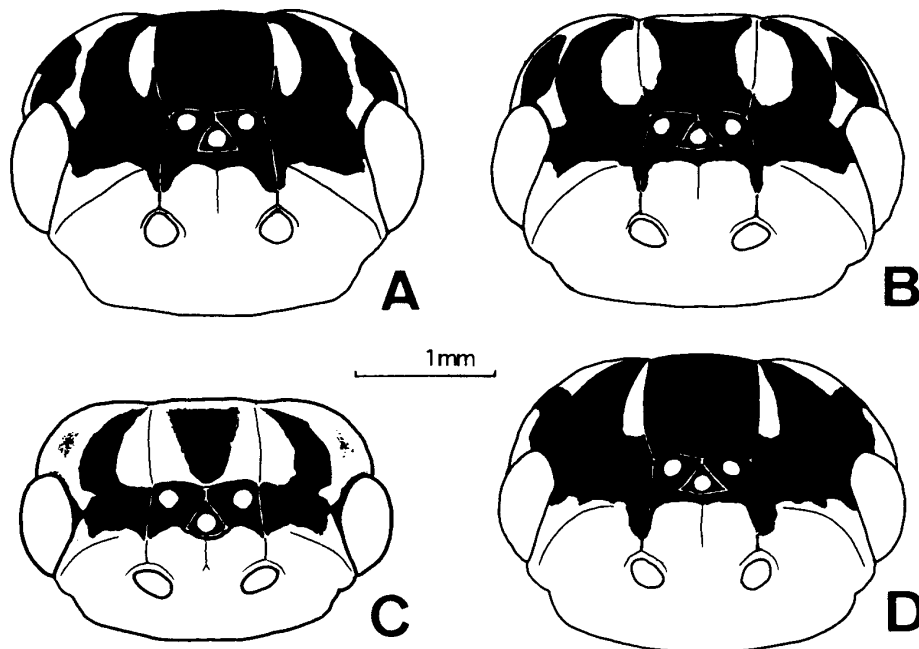


Fig. 11. Heads, ♂. A, *Pamphilius gyllenhali*, Pälkäne, Finland; B, *P. tricolor*, Mirugam, Korea; C, *P. virescens*, Mirugam, Korea; D, *P. brevicornis ibukii*, paratype, Yamada-onsen, Japan.

- Clypeus dull, spaces between punctures coriaceous, not shining; postocellar area with yellow crescent mark along lateral suture (Fig. 11 B); mesoscutal lateral lobe and mesepimeron with large yellow marks (Fig. 5 G–J); genitalia as in Fig. 6 D–F..... *P. tricolor*

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